Banking placental tissue: an optimized collection procedure for genome-wide analysis of nucleic acids.

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Authors: L M Wolfe, R D Thiagarajan, F Boscolo, V Tache, R L Coleman, J Kim, W K Kwan, J F Loring, M Parast, L C Laurent

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Public Summary:
This publications explains a detailed method by which placental tissues can be collected and stored for later analysis of DNA and RNA by the latest methods.

Scientific Abstract:
INTRODUCTION: Banking of high-quality placental tissue specimens will enable biomarker discovery and molecular studies on diseases involving placental dysfunction. Systematic studies aimed at developing feasible standardized methodology for placental collection in a typical clinical setting are lacking. METHODS: To determine the acceptable timeframe for placental collection, we collected multiple samples from first and third trimester placentas at serial timepoints in a 2-h window after delivery, simultaneously comparing the traditional snap-freeze technique to commercial solutions designed to preserve RNA (RNAlater), and DNA (DNAgard((R))). The performance of RNAlater for preserving DNA was also tested. Nucleic acid quality was assessed by determining the RNA integrity number (RIN) and genome-wide microarray profiling for gene expression and DNA methylation. RESULTS: We found that samples collected in RNAlater had higher and more consistent RINs compared to snap-frozen tissue. Similar RINs were obtained for tissue collected in RNAlater as large (1 cm(3)) and small (approximately 0.1 cm(3)) pieces. RNAlater appeared to better stabilize the time zero gene expression profile compared to snap-freezing for first trimester placenta. DNA methylation profiles remained quite stable over a 2 h time period after removal of the placenta from the uterus, with DNAgard being superior to other treatments. DISCUSSION AND CONCLUSION: The collection of placental samples in RNAlater and DNAgard is simple, and eliminates the need for liquid nitrogen or a freezer on-site. Moreover, the quality of the nucleic acids and the resulting data from samples collected in these preservation solutions is higher than samples collected using the snap-freeze method and easier to implement in busy clinical environments.